

Hydrogen Wave Heater for Nuclear Thermal Propulsion Component Testing, Phase I

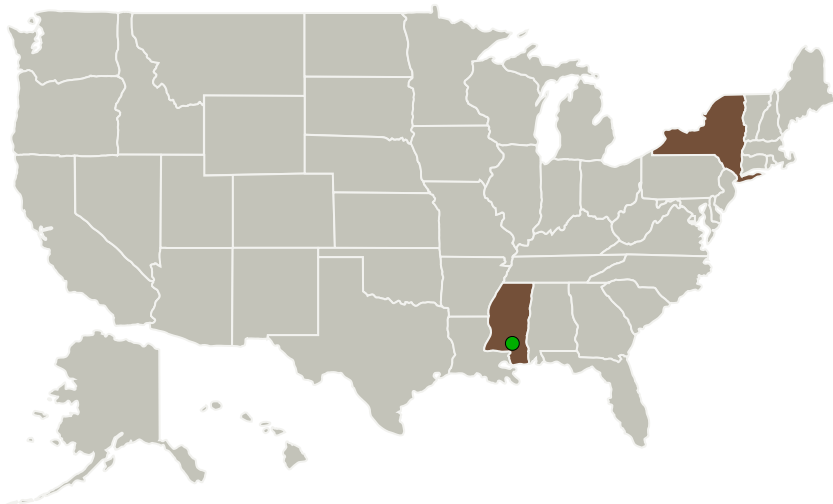
Completed Technology Project (2014 - 2014)



Project Introduction

NASA has identified Nuclear Thermal Propulsion (NTP) as a propulsion concept which could provide the fastest trip times to Mars and as the preferred concept for human space travel. The current NASA Strategic Space Technology Investment Plan states NTP is a high priority technology needed for future human exploration of Mars. In order to perform component testing in support of NTP engine development, an efficient means for delivering high-flowrate, high-temperature hydrogen is required. Non-nuclear generation of the desired hydrogen flowrates and temperatures for ground test of NTP components and subsystems is problematic. ACENT Laboratories is proposing development Hydrogen Wave Heater (HWH) for this application. The HWH is an innovative embodiment of a wave rotor. Wave rotors can be used as a primary compressor/heater or as a topping compressor/heater to multiply the temperature and pressure of an existing compression or heating process. These highly-scalable continuous-flow devices are capable of flow rates upwards of 100 lb/s and temperatures over 5000 F.

Primary U.S. Work Locations and Key Partners



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Nuclear Thermal Propulsion
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Organizations Performing Work	Role	Type	Location
ACENT Laboratories LLC	Lead Organization	Industry	Manorville, New York
● Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations	
Mississippi	New York

Project Transitions

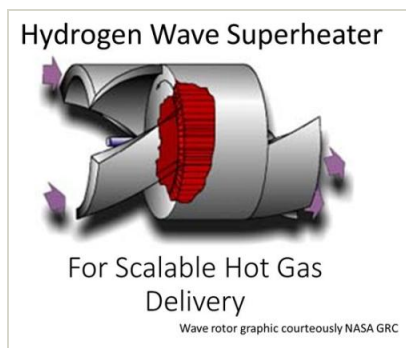
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140535>)

Images



Briefing Chart

Hydrogen Wave Heater for Nuclear Thermal Propulsion Component Testing, Phase I
(<https://techport.nasa.gov/image/129173>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ACENT Laboratories LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

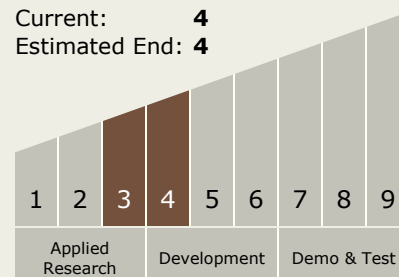
Carlos Torrez

Principal Investigator:

Robert P Kielb

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.4 Advanced Propulsion
 - └ TX01.4.3 Nuclear Thermal Propulsion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System